Chapter 11

Plan & Profile Sheets

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11.1 Objectives

- Understand and be able to use the GEOPAK Plan & Profile Sheet Generator

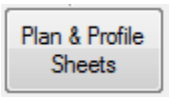
11.2 Definitions

Based on user-defined parameters and sheet size, sheet borders will be placed into a design file relative to a specific alignment. Modifications may be made to sheet size and location. Once the sheet boundaries are in the proper location, the designer may then place the sheet(s) into a design file(s) with the appropriate reference files and sheet cell.

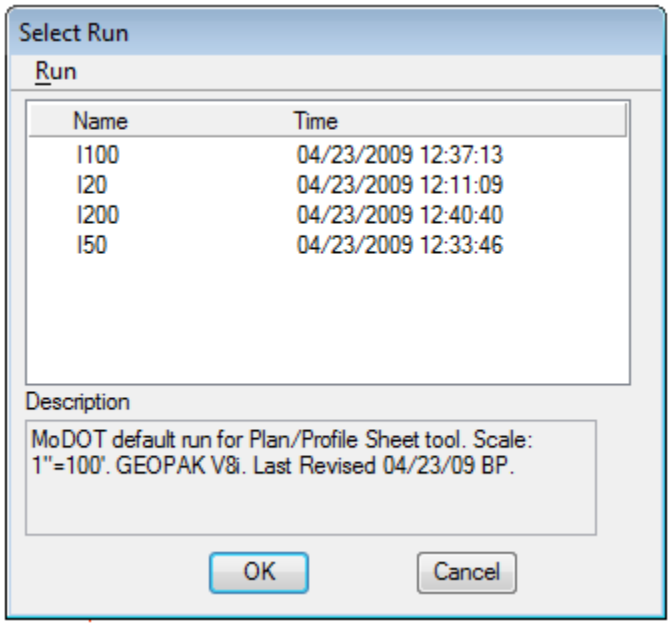
The CADD Support Center has set up a plan sheet library as a basis for generating typical plan and profile sheets. These plan sheet library includes all of the settings, which include General Settings, Plan Drawing Area, Profile Drawing Area, Grid Settings, Tabular Data, etc.

11.3 Accessing

The Plan and Profile Sheets Generator must be invoked via the **Road Project** flow chart button **Plan & Profile Sheets** shown to the right.



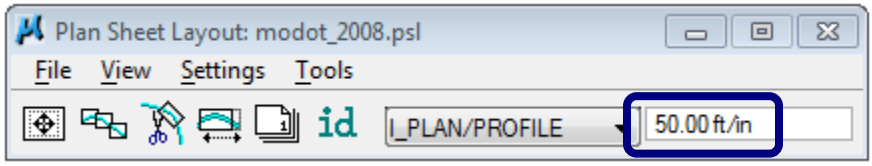
When the button is pushed the **Plan & Profile Sheets Run Picker** dialog appears.



The user will copy the run that represents the scale in which he/she is interested. Each run is configured to minimize user input.

RUN NAME	DESCRIPTION
I100	English Sheet for a 1"=100' scale
I200	English Sheet for a 1"=200' scale
I50	English Sheet for a 1"=50' scale
I20	English Sheet for a 1"=20' scale

Upon entering a run, the Sheet Layout dialog appears. The sheet scale part of the dialog is automatically set for each default run.



11.4 Sheet Library

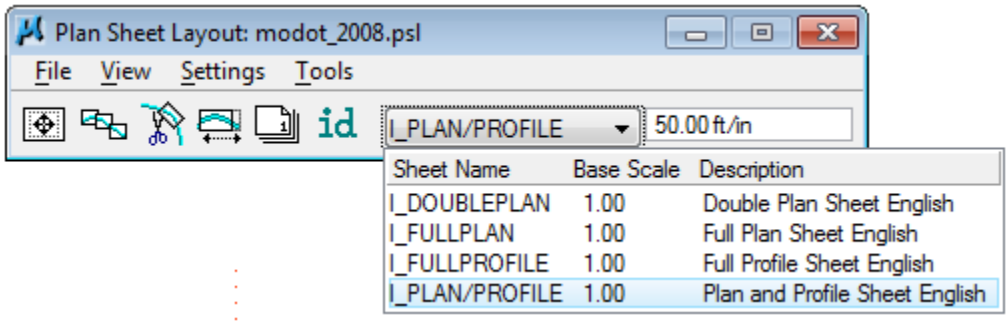
A sheet library must be attached to the current session. CADD Support has set up the tool so the MoDOT sheet library (modot.psl) is automatically attached.

The sheet library contains all the parameters required to layout and to clip the sheets. Only CADD Support is authorized to edit the MoDOT sheet library. Any other sheet libraries will not be supported.

11.5 Sheet Types

The sheet library contains four types of sheets both for English and Metric projects. They are:

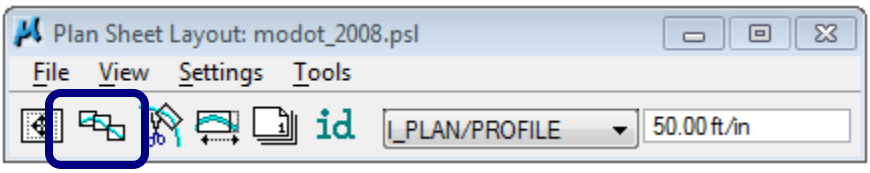
- Double Plan
- Full Plan
- Plan/Profile
- Full Profile



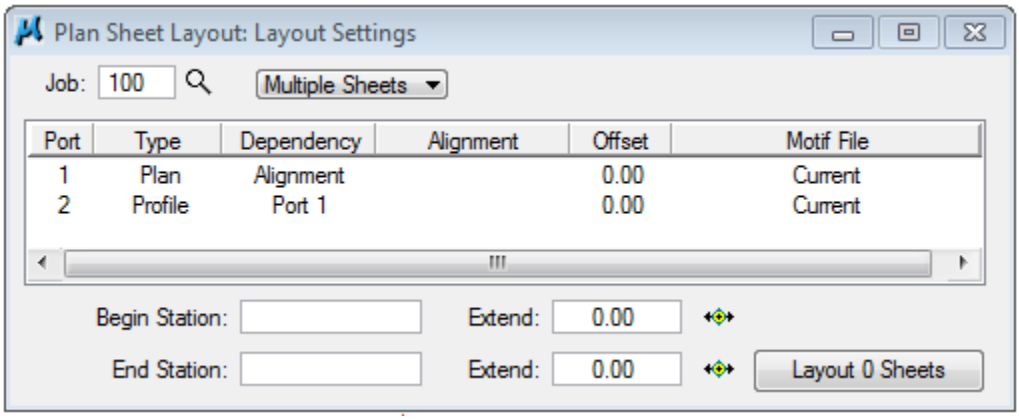
To select a sheet type, click in the list box area of the dialog, causing it to expand as shown to the right; move the cursor to the type of sheet desired and click again.

11.6 Sheet Layout

Once the type of sheet has been selected, the user is ready to layout the sheets. To access the layout process, select the layout icon from the dialog box or by selecting **Tools>>Sheet Layout.**



The **Layout Sheets** dialog appears.



11.6.1 Job Number

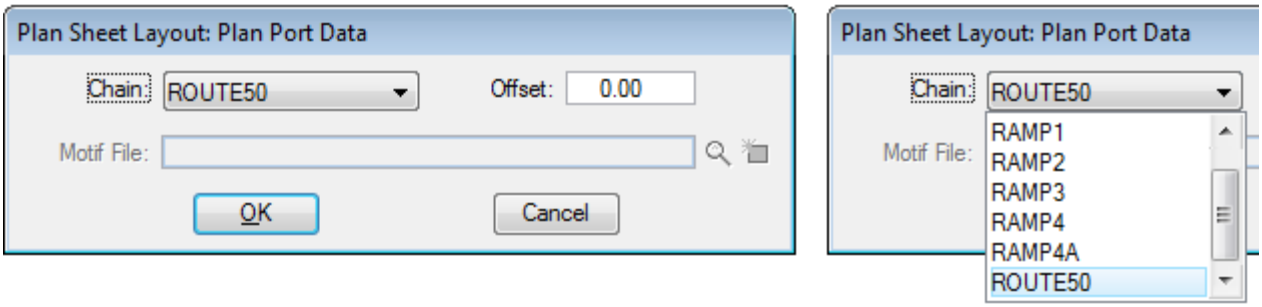
The job number is populated based on the .gpk file selected through Project Manager. With the job number selected, the user is ready to set up each port.

11.6.2 Ports

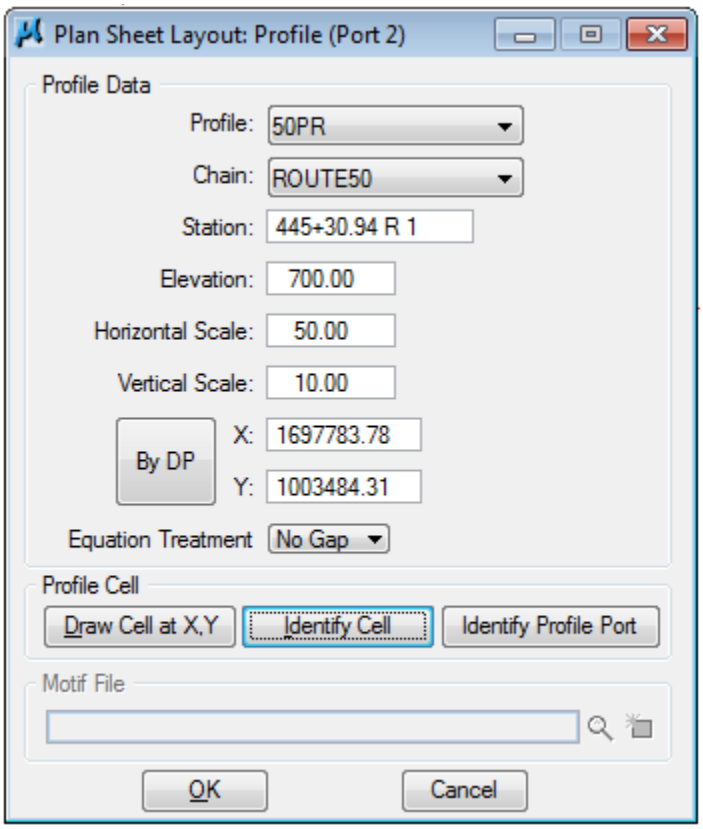
Depending on what type of sheet is selected, the user may have one or two ports. A port is typically a rectangular area that shows a particular section in a sheet, for instance, a standard plan and profile sheet contains two ports, one plan port and one profile port.

The job specific data for each port must be set. If there are two ports, it is important to enter the data for Port 1 first. Double click on a port to enter the data for that line.

If it is a plan type port the next dialog box appears. Select the chain via the pull down list box. Once the chain is selected, click the **OK** button.



If it is a profile port, the following dialog appears. The profile must be selected from the Profile list box.



The rest of the fields in the **Profile Data** area of the dialog can be filled in two ways. One way is to manual fill each of the field with the proper information. However, if a profile cell has been plotted for the alignment, the user can automatically populate the fields by clicking on the **Identify Cell** button and data pointing on the plotted cell. If a profile cell does not exist, the **Draw Cell at X, Y** can be used to place a profile cell once the information has been manually entered into the dialog.

The Profile Data fields contain the following information:

Station: station value of the data point used to define the location of the profile;
Elevation: elevation value of the data point used to define the location of the profile;

Horizontal Scale: horizontal scale of the plotted profile;
Vertical Scale: vertical scale of the plotted profile;
DP X: the X coordinate of the profile location; and
DP Y: the Y coordinate of the profile location.

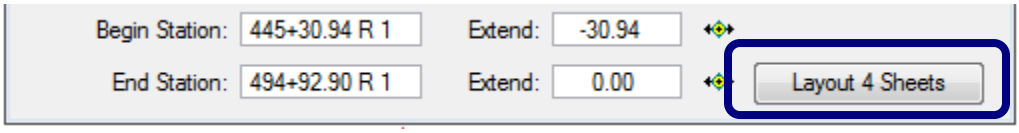
The X and Y coordinates can be typed in or set by choosing the **By DP** button and data pointing in the MicroStation drawing to set the origin point. If the profile has a station equation, the profile can be plotted with gaps or with no gaps.

Once the profile information is populated, click on the **OK** button.

11.6.3 Station Range

The **Beginning Station** and **Ending Station** fields are automatically filled in with the station limits of the chain identified in the upper portion of this dialog box. Should the user want to begin or end at a different location the user has the option to type in the station limits for sheet processing or click the **DP** button and data point a location on the screen along the center line.

In addition, the user has the option to start the sheet layout before or after the beginning or end of the alignment by setting the appropriate values in the **Extend** field. A positive number moves in the direction of increased stationing, while a negative number moves in the direction of decreased stationing. For example, the values for the Begin Station shown below will cause the first sheet to start at station 445+00, which is 30.94 feet before the beginning of the chain.

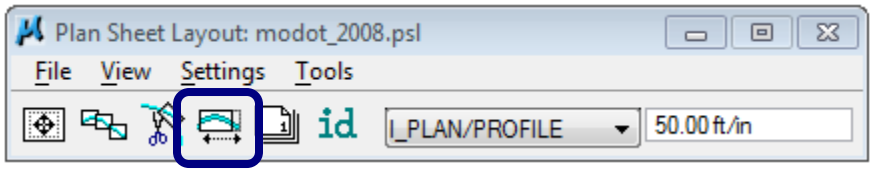


Based upon the begin and end station information the dialog will indicate how many sheets will be laid out as shown above. The user then selects the **Layout Sheets** button to layout the sheets.

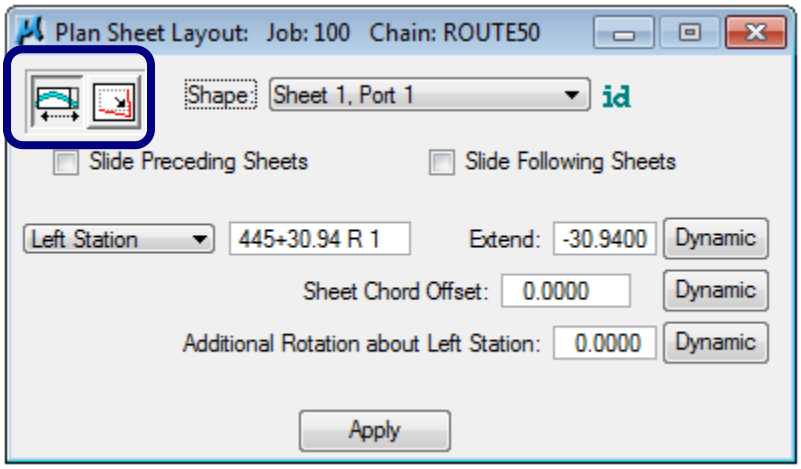
11.7 Modify

Once the above process is complete, the user should review the location of all the sheets to see if any modifications are needed.

To access the Modify mode, select the **Modify Sheets** icon or the menu path **Tools>>Sheet Modify**.

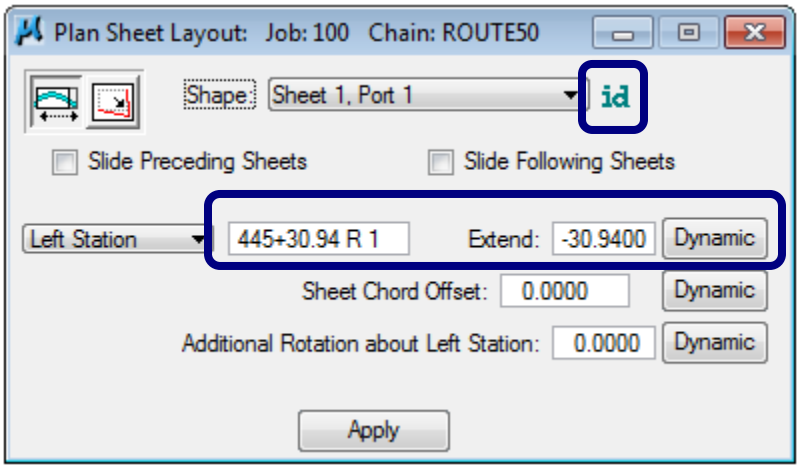


Two major modifications are supported and are selected via icon in the upper left corner of the dialog box shown below. The user has the options of **Slide Sheets** or **Modify Drawing Area.** As the modification type is selected, the dialog changes to reflect the selection.



Slide Sheets - slides previously placed sheets along the alignment; adjacent sheets can remain in their original location or be moved as well.

First, the user needs to identify the port to be modified by either selecting it from the list of all shapes in the current set or by pressing the **Id** button and graphically selecting the clipping shape for the port, which will automatically fill the **Shape**.



Next, determine whether only one sheet is to be modified or if the modification should be carried over to adjacent sheets. If the sheets preceding the current sheet are also to be moved, then activate the **Slide Preceding Sheets** toggle. If the sheets after the current sheet are to be moved a corresponding amount as the original shape, activate the **Slide Following Sheets**. If all sheets should be adjusted the same as the original sheet, activate both the **Slide Preceding Sheets and Slide Following Sheets.**

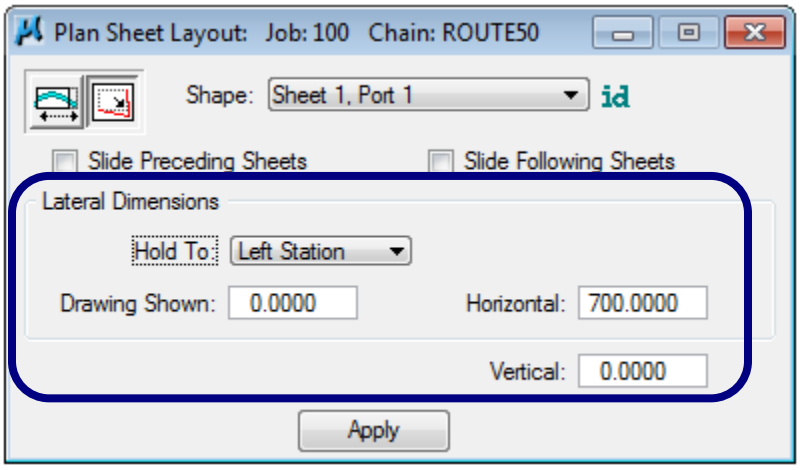
The sheets can be moved dynamically or by value. The station of the sheet is populated when the sheet is selected. To move the sheet along the alignment, enter the value (in terms of master units) in the **Extend** field or just enter the new station value. If entering a value in the **Extend** field, a positive number moves in the direction of increased stationing, while a negative number moves in the direction of decreased stationing.

To move dynamically, press the **Dynamic** button to the right of Extend, which attaches the sheet to the cursor. Then place a data point to initiate moving the cursor, noting the station and Extend values changing as you move. To stop the dynamics, place a final data point to identify the location and terminate sliding.

To move the sheet further away (or closer to the alignment) without changing the stationing, use the **Sheet Chord Offset** using a value or dynamically

The **Rotation** can be entered as an angle or dynamically. Rotation always pivots about the left edge of the clipping shape. Rotation alone does not cause Preceding or Following sheets to slide.

Modify Drawing Area - modifies the Clip borders.



The sheet must be identified using the same procedure as the **Slide Sheets tool**. The **Slide Preceding** and **Following Sheets** is also supported.

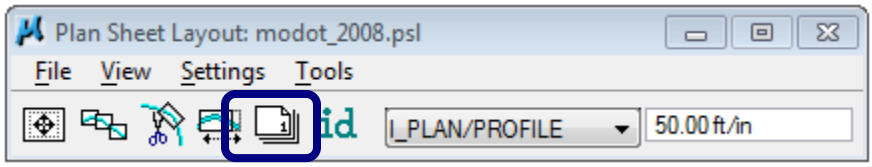
When the sheet is identified, the fields in the **Lateral Dimensions** are automatically populated. The user has the option to hold the **Left Station**, the **Right Station** or the **Center Station**. Only one station can be held while the other two are adjusted to the revised drawing parameters. Set the desired values and press the **Apply** button to commence redrawing.

Note: There are no dynamic options when changing the drawing area.

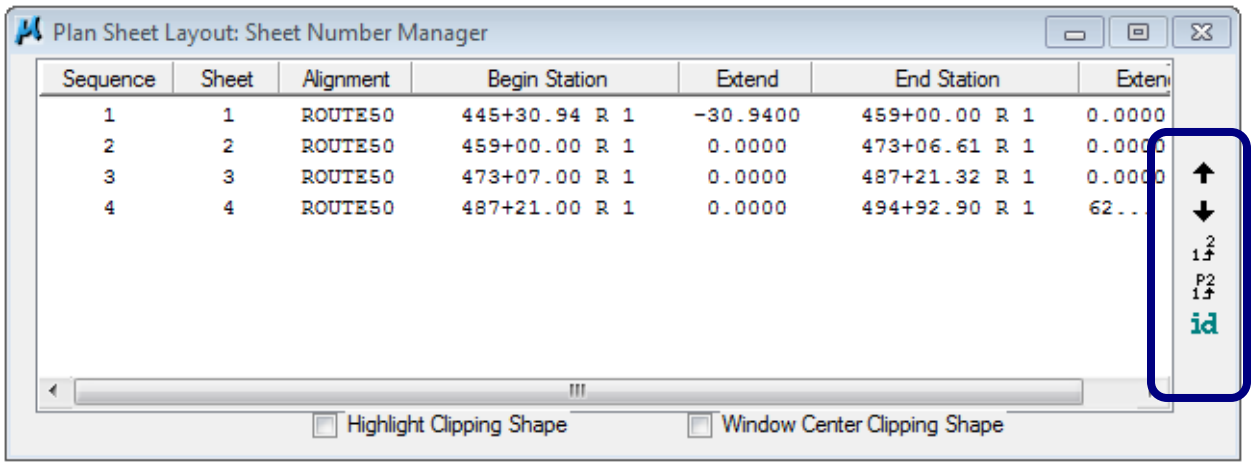
11.8 Sheet Number Manager

Once the clipping shapes have been placed in the MicroStation drawing, the user can adjust the sequence of the sheets by using the **Sheet Number Manager**.

The Sheet Number Manager can be accessed via pull down **Tools >> Sheet Number Manager** or by selecting the icon on the dialog box.



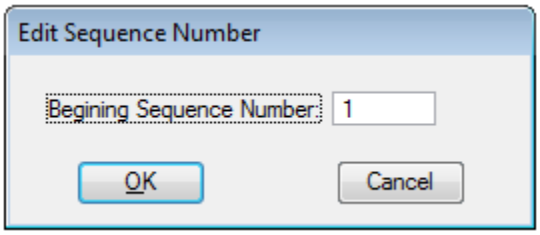
Once the tool is selected the dialog below appears.



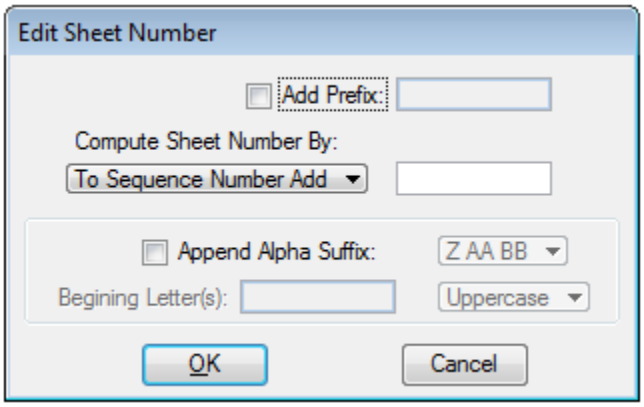
The dialog lists all the sheets in the order they will be drawn. By default the sequence of the sheets matches the sheet number. If the sequence of the sheets needs to be adjusted, the user can highlight the sheet and use the **up and down arrows** on the right hand side of the dialog.

The **id** icon allows the user to select a clip shape from the MicroStation file. The associated line in the list box is highlighted.

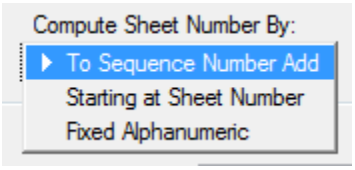
The **Edit Sequence** tool may be used in the case that there are too many sheets to move with the arrows. Highlight the sheet to be moved and press the icon. The **Edit Sequence Number** dialog opens.



If for any reason the user needs to change the sheet numbers, the **Edit Sheet Numbers** tool can be used. The user needs to highlight the sheets to be changed and press the **Edit Sheet Number** icon, which opens the dialog shown below.



The user has the option to add a prefix, append an alpha suffix, or do both. The sheet numbers can be edited by the options shown below:



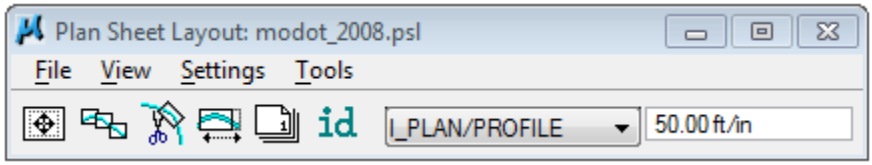
To Sequence Number Add – It renumbers the sheet by adding a value to the original sheet number. For example, if the original sheet number was 1 and sequence add number is 100; the new sheet number becomes 101.

Starting at Sheet Number – The user specifies a given sheet number to start from.

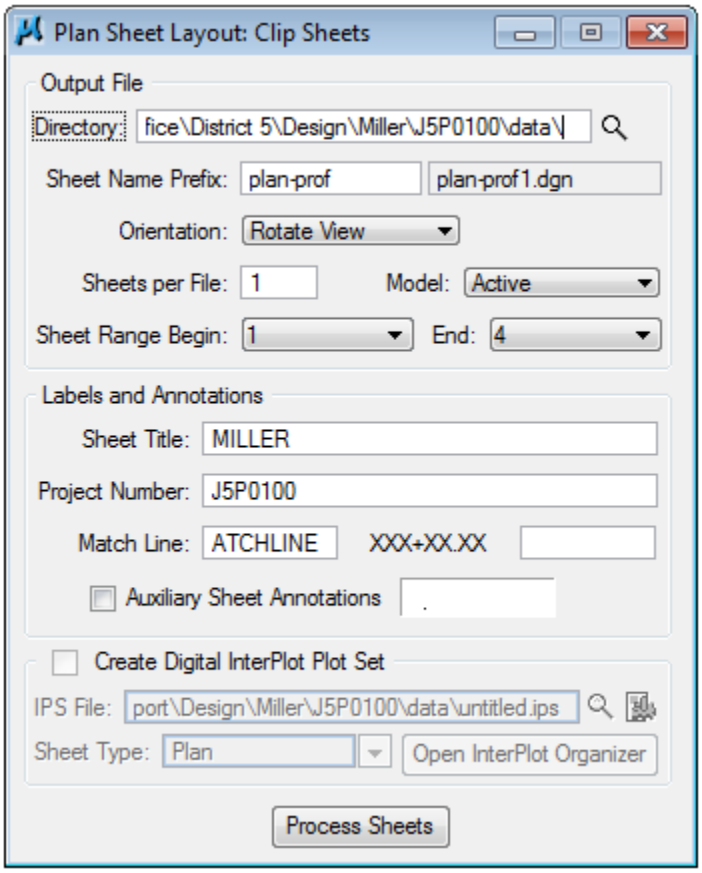
Fixed Alphanumeric - This field is used in combination with the bottom entries in the dialog. The user specifies to hold a fixed alphanumeric value and toggles the **Append Alpha Suffix.**

11.9 Clip Sheets

The **Clip Sheets** process can be accessed via pull down **Tools>> Sheet Clip** or by selecting the icon on the dialog box.



The following dialog appears.



11.9.1 Output File

Directory – Path to folder where the design file containing the sheet(s) will be placed.

Sheet Name Prefix – Name of the design file containing the sheet (s). GEOPAK will add a 1, 2, etc. to the end of each file name.

Orientation - The tool supports two types of orientation, Rotate View and Rotate Reference.

Rotate View - will attach all reference files and rotate the view to conform to the orientation of the sheet. This option allows true coordinates for the file. (Note: If **Rotate View** is used, tools such as Plan View Labeler, and DP Station and Offset can still be used). **Rotate Reference** - Will rotate each reference file to orient itself with the sheet. (Note: It is suggested to use the **Rotate View** mode.)

Sheets per File - Indicates how many sheets are drawn per design file. (Note: for **Rotate Reference** only)

Model – The *Clip Sheet Tool* supports the use of models. User can select the *Active* model or *By Sheet Name.*

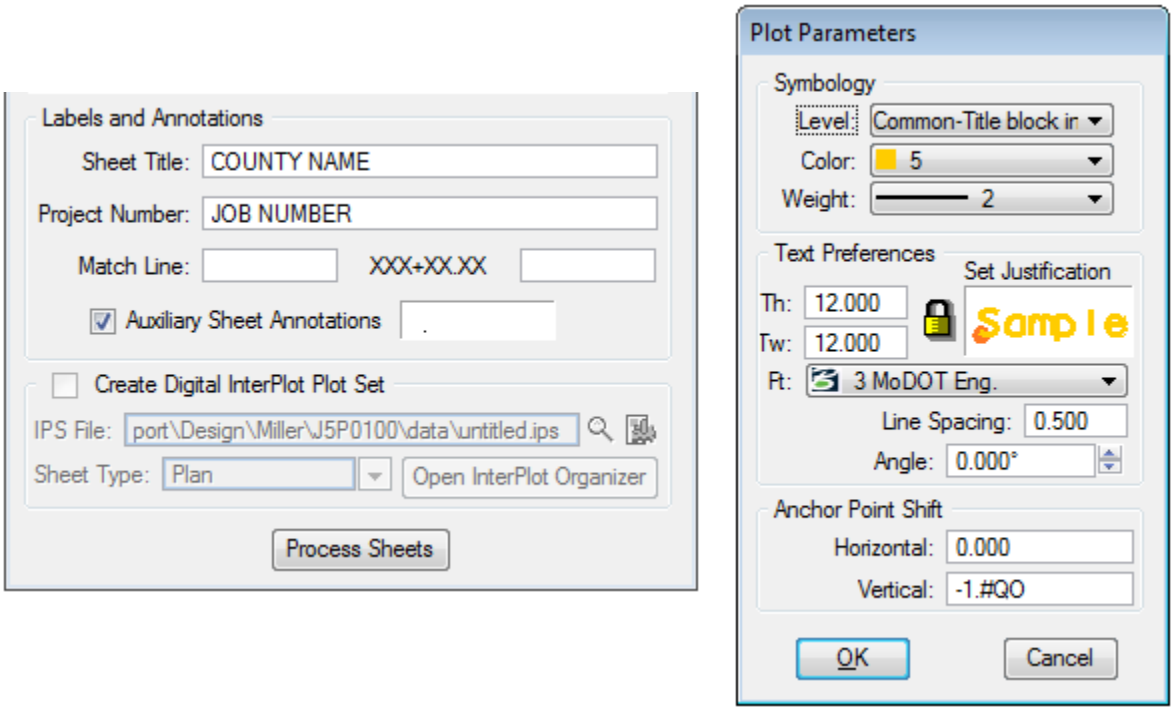
Sheet Range – Allows the user to choose which sheets to clip by selecting a **Begin** and **End** range.

11.9.2 Labels & Annotations

Sheet Title- CADD Support has set this field to be the name of the project county for a standard MoDOT sheet title block.

Match Lines – Will place a match line station.

Auxiliary Sheet Annotations – Will allow the user to add any other notes not already set in the default settings. Once the **Auxiliary Sheet Annotations** toggle is turned on, the **Sample** graphics button will become available, and the user can define the plot parameters accordingly. These Auxiliary Sheet Annotation will provide an additional label with the *name of the chain, the rotation angle and the sheet number*.



Process Sheets - Once all the fields in the dialog box are entered, selecting the **Process Sheets**, initiates the sheet(s) creation.

11.10 File Pulldown Menu

Sheet Library – This menu option has options for creating, attaching, or editing a library. CADD Support maintains the MoDOT plan sheet library. Other sheet libraries will not be supported.

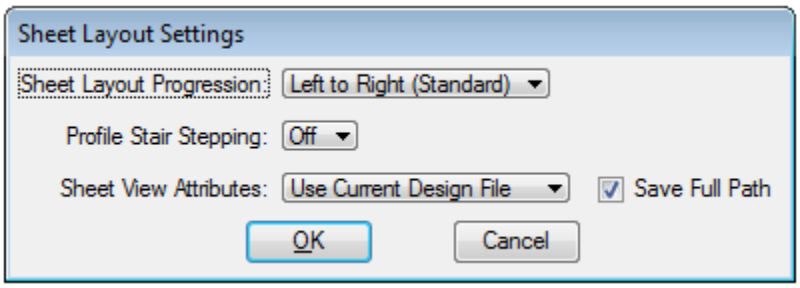
Exit – Exits the Plan/Profile Sheets application.

11.11 View Pulldown Menu

When different types or scales of plan sheet shapes are placed within one plan view drawing, the view menu options allow the user to filter sheets by names or by scale to display the shapes accordingly.

11.12 Settings Pulldown Menu

Only one option is available in this pulldown menu. The Sheet Layout settings option allows the user to set a Sheet Layout Progression, Profile Stair Stepping, and Sheet View Attributes.



11.13 Tools Pulldown Menu

Identify Sheet – Identifies the scale, port and number of the selected sheet shape

Sheet Composition - Opens the sheet composition dialog box. It allows the user to define the drawing area. CADD Support has set up default settings for MoDOT users.

Sheet Layout – Opens the layout sheet dialog.

Sheet Clip – Opens the clip sheet dialog.

Sheet Modify – Opens the modify sheet dialog

Sheet Number Manager – Opens the sheet number manager.

Draw Tabular Annotation (Sheet Clip Mode) – When the ports are set up in a tabular manner, this tool allows the user to define the tabular data to be included within the plan/profile sheets.

Process Classic Plan & Profile Runs – This will import certain information from the *Classic Plan & Profile* runs to create a sheet library. MoDOT has developed the modot.psl as the library to be used with the MoDOT default runs.

11.14 Group Exercise: Road1

1. Within the ***J2P0200\data_11*** folder, open the file: ***Plan_J2P0200.dgn***
2. Create a new file named ***Plan_Profile_J2P0200.dgn*** based on the following 2D seed file:

   pw:\CADD_Standards\Seed Files\Design - English\i_project_2d_PowerGEOPAK.dgn
3. Reference in the following files:

   Civil_Geometry_J2P0200.dgn

   Corridors_J2P0200.dgn

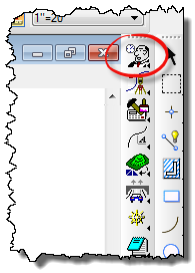
   Land_Boundaries_J2P0200.dgn

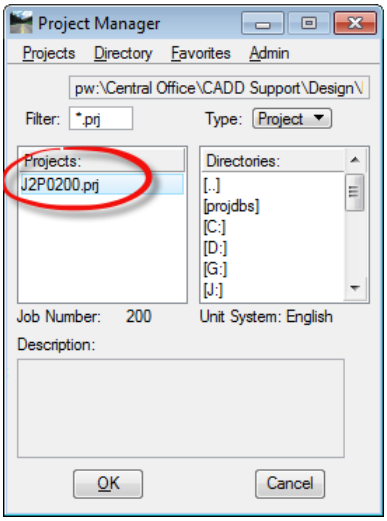
   Plan_J2P0200.dgn

   Profile_J2P0200.dgn

4. Click on the **Project Manager** icon and open the following GEOPAK project:

   pwname:\\MoDOT\Documents\District CADD\Design\Randolph#\J2P0200\project\J2P0200.prj





5. Edit the PRJ file so that the ***job200.GPK*** file located in the ***data_11*** folder can be found.

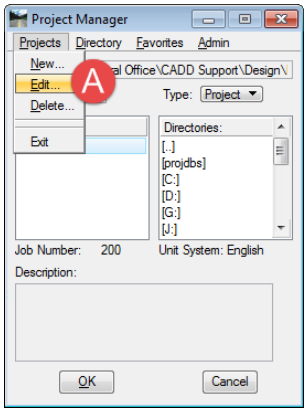
A. **Edit** PRJ

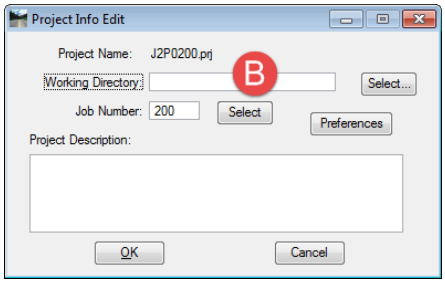
B. **Clear out** working directory

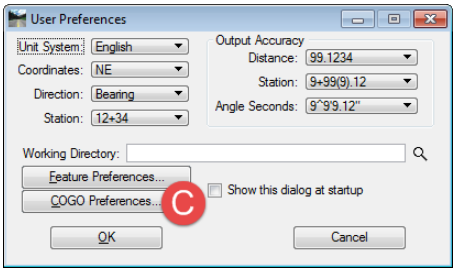
C. **Open** COGO Preferences

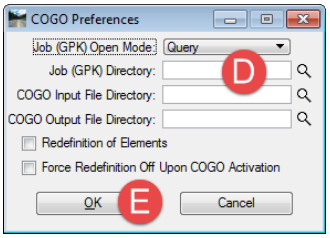
D. **Clear out** Job Directory

E. **Click OK** to move on

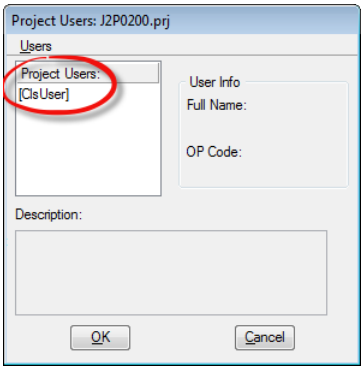




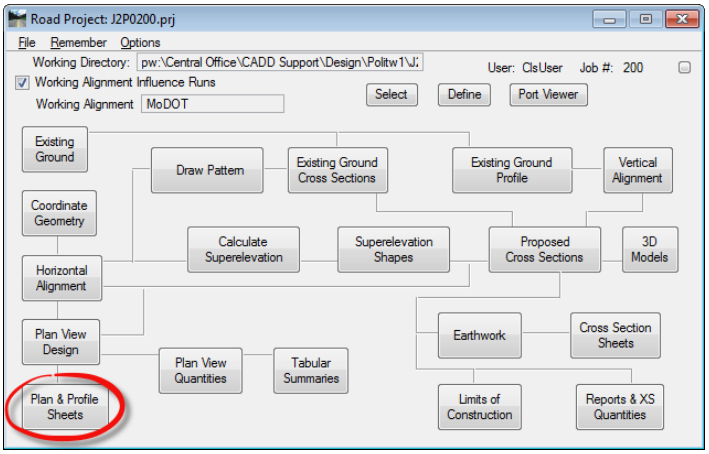




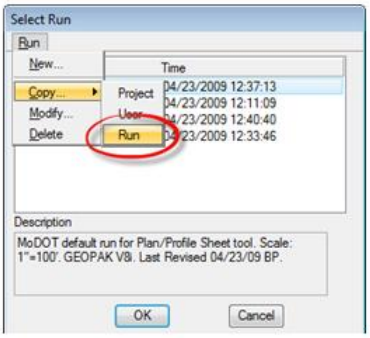
6. Enter the project as **ClsUser** for this exercise.

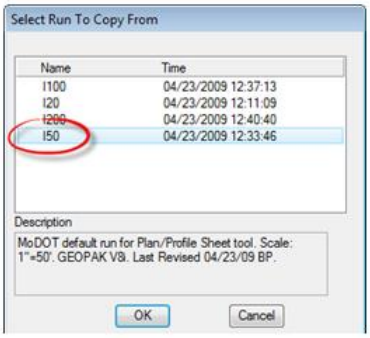


7. Select **Plan & Profile Sheets** from the **Road Project** flow chart

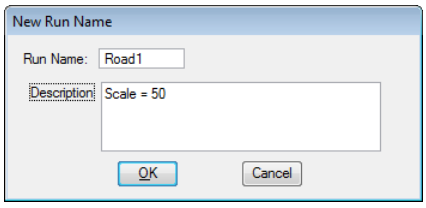


8. **Select Run >> Copy >> Run** and choose the **I50** run.

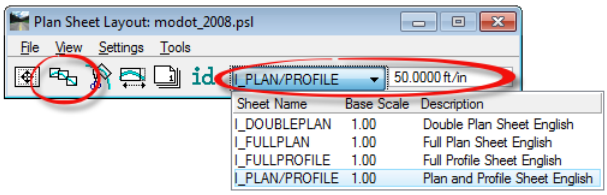




9. Name the new run **Road1** and give it a description to identify a 50 scale has been used. Then **open** the newly copied Road1 run.



10. Select the **Plan/Profile** sheet from the pull down.

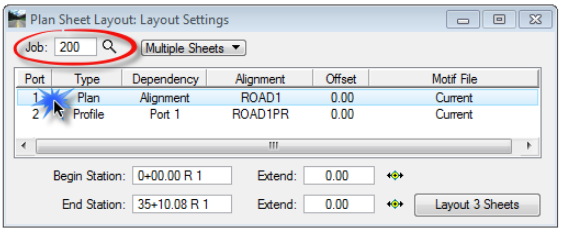


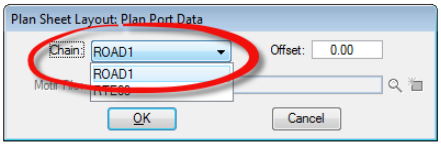
11. Select the **Layout Sheets** via icon as shown above or by pull down menu **Tools>>Sheet Layout**.

12. Set up the **Layout Sheets** dialog with the information for the Road1 working alignment:

Select Job 2**00** by clicking on the open folder icon, as shown below.

Double click on **Plan** (Port 1). Select the **Road1** chain from pull down.





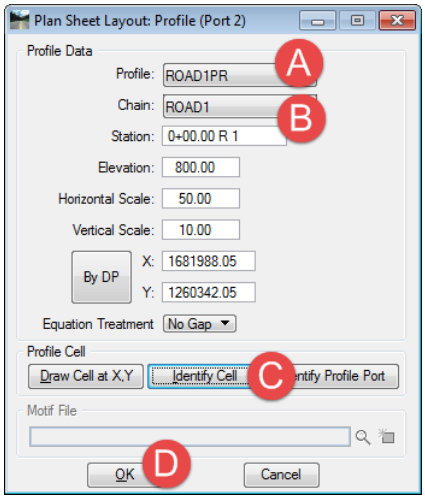
Double click on **Profile** (Port 2).

A. **Select** ROAD1PR profile

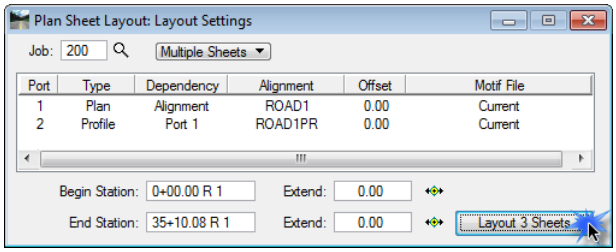
B. **Select** ROAD1 chain

C. **Select** Identify Cell

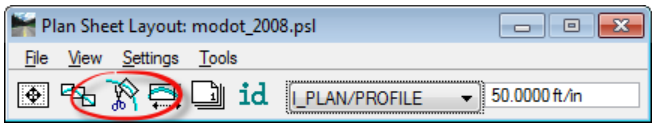
D. **Click OK** to move on



13. Click the Layout 3 Sheets button to create the sheet blocks for the plan and profile sheets.



14. Select the **Clip Sheets** icon or via pull down menu **Tools >> Sheet Clip**



Populate the Clip Sheets dialog as shown below.

The directory to create the sheets to will be:
pwname:\MoDOT\Documents\ District CADD\Design\Randolph#\J2P0200\data_11

Once the information is filled out, select **Process Sheets**.

A. **Path** the directory to place the sheet files
- District CADD\Design\Randolph#\J2P0200\data_11

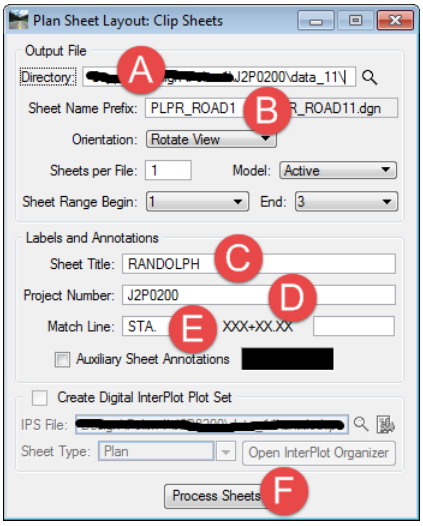
B. **Name** the sheet prefix – ***PLPR_Road1***

C. **Sheet Title** county name – ***RANDOLPH***

D. **Project Number** – ***J2P0200***

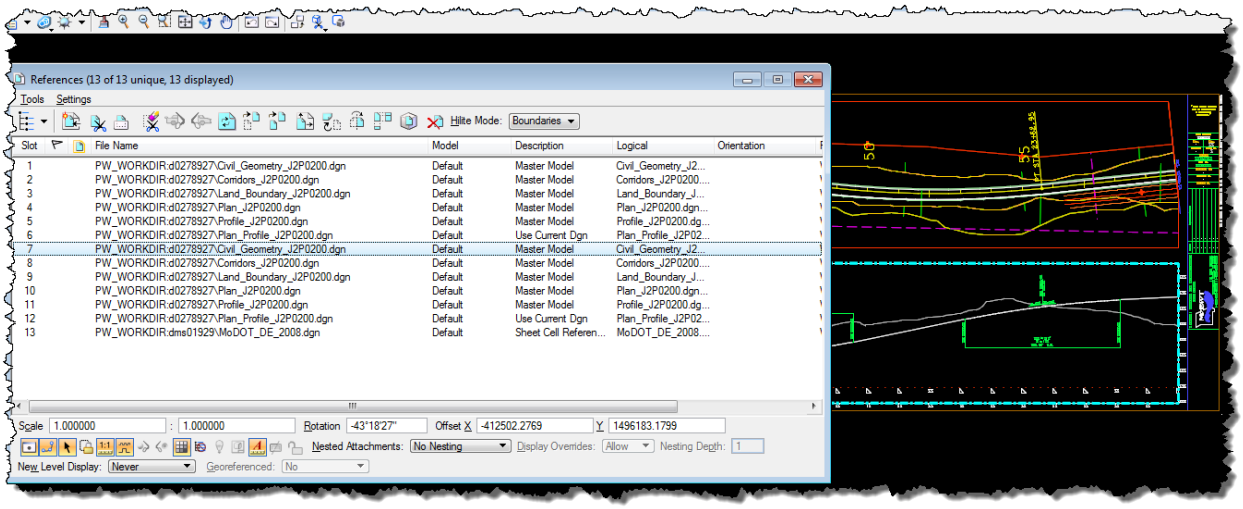
E. **Match Line** – ***STA.*** (space after the period)

F. Click the ***Process Sheets*** button to begin processing

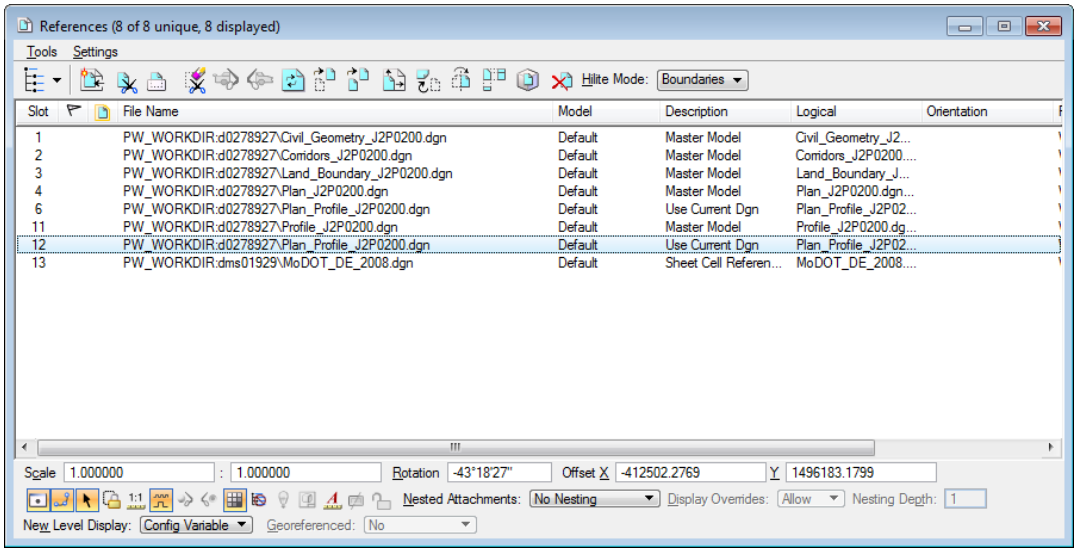


15. Open a newly created plan-profile sheet.

16. Open the Reference Dialog and detach the extra references that get created by default.

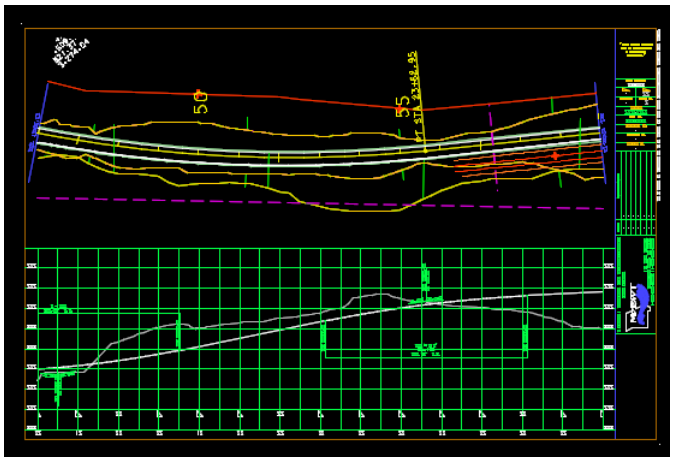


As you select the references the plan or profile port will highlight.
Remove the profile information from the plan port and the plan information from the profile port by detaching the "extra" references.

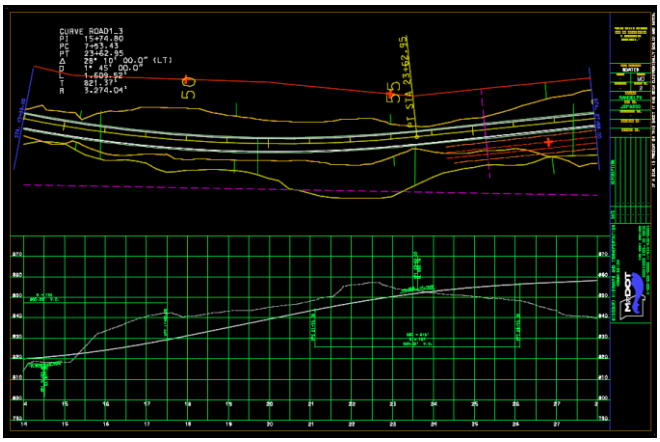


17. Open the MicroStation **Level Display** tool and using the "Off By Element" option from the right click menu turn off the display of the red shape surrounding the plan port and the white shape surrounding the profile port.

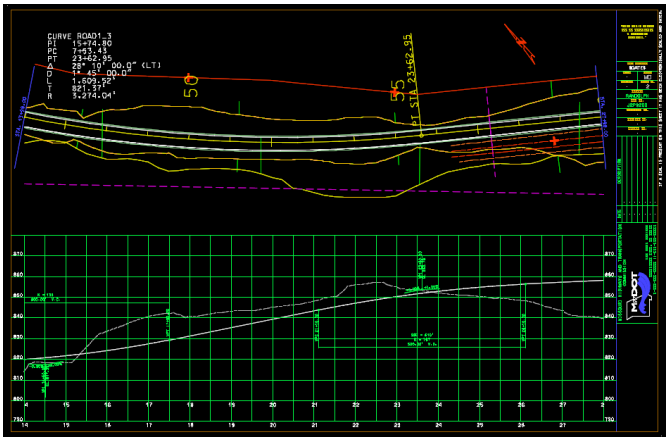
18. Turn on Level **Border-Plan-profile major grid lines** in the **MoDOT_DE_2008.dgn** reference file in the plan sheets.



19. Use the option in the reference dialog to do an exchange into any files that have text that need to be moved and rotated for the plan sheet to have the correct look and modify as needed.



20. Place a north arrow using AccuDraw to complete the plan sheet.



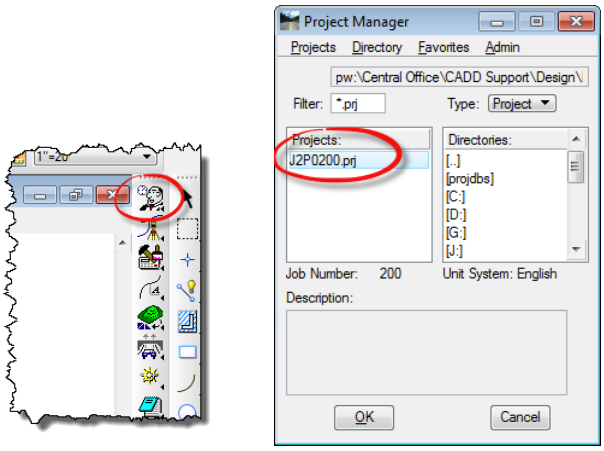
11.15 Individual Exercise: Route63

1. Using ProjectWise open the following MicroStation file:

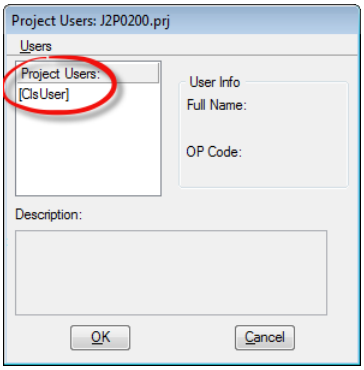
pwname:\\MoDOT\Documents\DistrictCADD\Design\Randolph#\J2P0200\data_11\Plan_J2P0200.dgn

2. Open the **Project Manager** icon and open the following GEOPAK project:

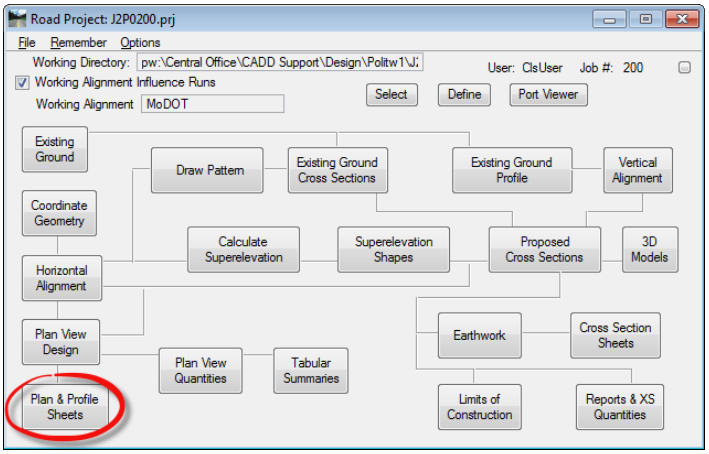
pwname:\\MoDOT\Documents\District CADD\Design\Randolph#\J2P0200\project\J2P0200.prj



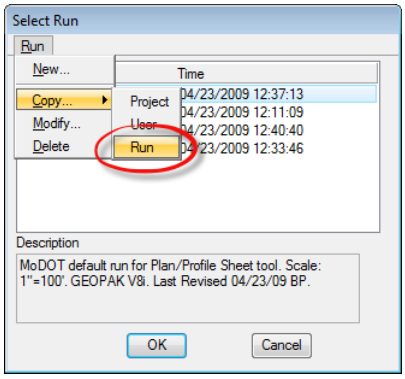
3. Enter the project as **ClsUser** for this exercise.

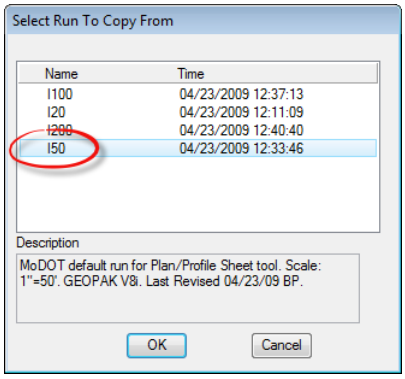


4. Select **Plan & Profile Sheets** from the **Road Project** flow chart



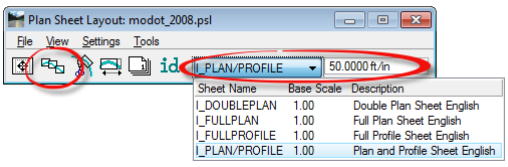
5. **Select Run >> Copy >> Run** and choose the **I50** run.





Name the new run **Route63**. O**pen** the newly copied Route63 run.

Select the **Plan/Profile** sheet from the pull down.



Select the **Layout Sheets** via icon or by pull down menu **Tools>>Sheet Layout**.

6. Set up the **Layout Sheets** dialog with the information for the Route63 working alignment:

   Select Job 2**00** by clicking on the open folder icon, as shown below.

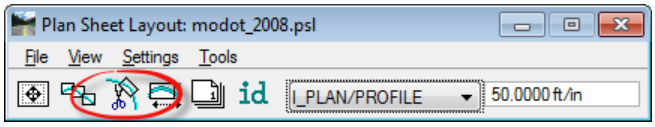
   Double click on **Plan**. Select the **Route63** chain from pull down.

   Double click on **Profile**. Select the Identify Cell button and then select the Geopak Cell pertaining to Route63.

7. Once the Ports have been populated, select the **Layout Sheets** button.

   This will place the sheet blocks around the plan and the profiles in the design file.

8. Select the **Clip Sheets** icon or via pull down menu **Tools >> Sheet Clip**



The directory to create the sheets to will be:
pwname:\MoDOT\Documents\ District CADD\Design\Randolph#\J2P0200\data_11

Once the information is filled out, select **Process Sheets**.

A. **Path** the directory to place the sheet files
- District CADD\Design\Randolph#\J2P0200\data_11

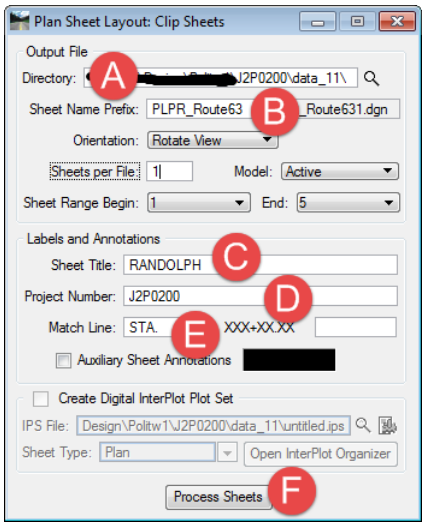
B. **Name** the sheet prefix – ***PLPR_Route63***

C. **Sheet Title** county name – ***RANDOLPH***

D. **Project Number** – ***J2P0200***

E. **Match Line** – ***STA.*** (space after the period)

F. Click the ***Process Sheets*** button to begin processing



9. Open a newly created plan-profile sheet.

10. Open the Reference Dialog and detach the extra references that get created by default.

11. Open the MicroStation **Level Display** tool and using the "Off By Element" option from the right click menu turn off the display of the red shape surrounding the plan port and the white shape surrounding the profile port.

12. Turn on Level **Border-Plan-profile major grid lines** in the **MoDOT_DE_2008.dgn** reference file in the plan sheets.

13. Use the option in the reference dialog to do an exchange into any files that have text that need to be moved and rotated for the plan sheet to have the correct look and modify as needed.

14. Place a north arrow using AccuDraw to complete the plan sheet.